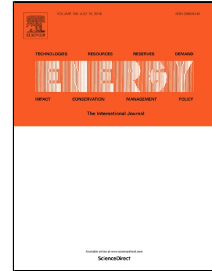


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# Ultra-low temperature district heating system with central heat pump and local boosters for low-heat-density area: Analyses on a real case in Denmark

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## Abstract

Low temperature district heating (DH) system gives easier access to the renewable energy as heat sources and improves the heat distribution efficiency. From the exergy point of view, low DH supply temperature also better matches the exergy demand of space heating and domestic hot water. It is more beneficial to operate district heating system under lower temperature level for the heat-sparse area where the distribution losses accounts for a large proportion in the total heat supply. In this study, the actual performance of a case ultra-low temperature district heating (ULTDH) system in Denmark was investigated based on long-term measurements. The system combines the central heat pump and local boosters, while the impact of such configuration on the overall system performance was analysed. The energy, exergy and economy performances of the case system were compared to medium temperature district heating system (MTDH) and low-temperature district heating system (LTDH). The results show that the LTDH system without supplementary heating has the highest energy and exergy efficiency. While the ULTDH system has better performance compared to the

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